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## Links between risk and attachment security: Models of influence

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### Abstract

The relation between maternal behavior and child attachment security is weaker among low SES samples, but it is unclear how stressors/risks associated with low SES alter the dynamics of attachment relationships. Results of this study of 63 low income mothers and their 24–36-month-old children indicated that the influence of multiple economic risks on children's security is mediated through an associated effect on maternal behavior, while emotional risks—those directly affecting the emotional climate of the home—exert direct influences on child security not mediated by maternal behavior. A moderating effect of emotional risks on the relation between maternal behavior and child security suggested that maternal behavior is less strongly associated with child security in families with many emotional risks. Implications of emotional risks as predictors of child security and the characteristics of low-income homes that moderate the association between security and maternal behavior are discussed.

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*Keywords:* Attachment; At-risk populations; Poverty; Maternal behavior

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### 1. Introduction

Children living in poverty are more likely to develop insecure attachments than other children (Aber, Jones, & Cohen, 2000; Fish, 2001; Spieker & Booth, 1988; van Ijzendoorn, Schuengel, & Bakersman-Kranenburg, 1999; Vondra, Hommerding, & Shaw, 1999). Secure attachment relationships may be particularly beneficial for low-income children because attachment security can buffer the impacts of high-risk settings on children's development (Sroufe, Egeland, & Kreutzer, 1990).

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Moreover, children living in poverty are more likely to develop emotional and behavioral problems than middle-class children (McLoyd, 1998), both of which are linked to insecure attachment relationships (Thompson, 1998).

In recent years attachment theorists have called for increased attention to the role that family and environmental context plays in influencing children's attachment security (Thompson, 2000; Waters & Cummings, 2000). This is particularly relevant when considering the development of attachment relationships within low-income families. Families in poverty often face multiple chronic stressors (also called risks, and including factors such as extremely low family income, single parenthood, teenage child bearing, and low levels of maternal education) that create a family environment that is less supportive of children's emotional needs (McLoyd, 1998). However, the specific links between the risks common among low-income families and children's attachment security have not been identified. The influence of risk on security can be conceptualized in three ways. First, *mediating* models (i.e., Belsky, 1984, 1999) maintain that children in low-income environments are more likely to have insecure attachment relationships because their mothers experience high amounts of stress and depression, which in turn leads to decreased maternal sensitivity and child attachment insecurity. Second, a *moderating* model proposes that the presence of risks mitigates the relation between maternal sensitivity and security, thus decreasing the power of sensitivity to lead to security in high-risk populations. Consistent with this, De Wolff and van Ijzendoorn (1997) demonstrated that maternal behavior is less strongly associated with security in high-risk samples. Third, recent empirical and theoretical work increasingly suggest that there may also be *direct effects* of risks on children's security (Waters & Cummings, 2000) by eroding the child's sense of emotional well-being within the family, such as by witnessing parental conflict. The goal of this study was to examine the predictive power of each model as it pertains to the development of attachment relationships within a sample of low-income mothers and children. Moreover, we were interested in exploring whether the type of risk—such as the economic risks associated with poverty or the emotional climate of the home—was important in determining the appropriate pathway from risk to security.

Attachment theory maintains that secure attachment relationships are created when parents consistently respond to children in a warm, sensitive manner, which engenders a child's belief in the emotional availability of the parent (Thompson, 1998). Children whose parents are responsive and supportive are predicted to develop secure attachment relationships, while children of either unresponsive or inconsistently responsive parents develop insecure attachment relationships. However, despite the emphasis placed on parental sensitivity by attachment theorists, it is now widely acknowledged that sensitivity plays a reliable but not robust role in promoting attachment security (Belsky, 1999; De Wolff & van Ijzendoorn, 1997; Thompson, 2000; Waters & Cummings, 2000). Thus, an important portion of individual variance in children's attachment security is unexplained after accounting for the influence of maternal sensitivity. Child characteristics could account for variance in attachment security; for example, some previous work has suggested that child temperament can influence children's attachment security (see Belsky, 1999, for a review). Likewise, risks prevalent among families in poverty could also influence children's security. Evidence has demonstrated that maternal sensitivity is a reliable but modest predictor of children's security, even within samples facing poverty and its related stressors (Barnett, Kidwell, & Leung, 1998; Diener, Nievar, & Wright, 2003; Goodman, Aber, Berlin, & Brooks-Gunn, 1998; Shaw & Vondra, 1993), but the previously reported relation between maternal behavior and child security in high risk samples tells little about the processes through which risk affects attachment security.

Because income alone is an unreliable predictor of attachment security (Diener et al., 2003; Spieker & Booth, 1988), most work studying the role of context in attachment security has focused on risks that negatively affect maternal behavior and thus presumably contribute to attachment insecurity (Aber et al., 2000; Belsky, 1999; McLoyd, 1998; Spieker & Booth, 1988). The accumulation of risks rather than the presence of any one specific risk factor pose the greatest threat to children's social and emotional development (Sameroff & Fiese, 2000; Siefer et al., 1996); the presence of multiple risks also increases the probability of insecure attachment relationships (Belsky, Rosenberger, & Crnic, 1995; Shaw & Vondra, 1993; Spieker & Booth, 1988; Vondra et al., 1999).

Mediated models linking cumulative risk and maternal sensitivity have been used to explain attachment security in high-risk populations. These models posit that mothers who experience high levels of stress due to risks behave less sensitively towards their children, thus leading to the development of insecure attachment relationships. However, existing evidence reveals inconsistent relationships between risks and maternal sensitivity. When comparing low-income and middle-class mothers as a group, middle-class mothers are more consistently sensitive and responsive (NICHD, 1997). Within low-income populations, however, other work has failed to find the predicted association between the extent of contextual risks experienced by the mother and her sensitivity to her child (Goodman et al., 1998), or has found that some risks are more strongly related to sensitivity than others (Fish, 2001). The inconsistent findings in empirical work suggest that links between contextual risk factors and maternal sensitivity should be examined using multiple models of direct and indirect effects before assuming that risk primarily affects security through an associated decrease in maternal sensitivity. Moreover, little work has empirically examined the full model proposed by some attachment theorists, namely that the risks more common among low-income families lead to decreased maternal sensitivity, which in turn leads to a higher probability of insecure attachment relationships (Belsky, 1999). Instead, some research relying on mediated models has proceeded retrospectively: upon demonstrating that children in high-risk situations show higher rates of attachment insecurity, researchers have posited that mothers in high-risk situations are less sensitive without providing a measurement of maternal sensitivity. This is a serious shortcoming given the importance of clarifying the effects of contextual risks on both maternal sensitivity and child security (see, e.g., Shaw & Vondra, 1993).

Recent findings regarding the association between maternal behavior and child security indicate that risk influences attachment security in high-risk populations by moderating the relation between maternal behavior and child security (De Wolff & van Ijzendoorn, 1997). Using meta-analytic techniques, De Wolff and van Ijzendoorn found that maternal sensitivity showed a weaker relation to child security in low SES samples, and called for more attention to the role of context in the creation of attachment relationships. Despite their findings, no work to date has specifically examined risks as a potential moderator of the relation between maternal behavior and child security. The smaller effect sizes of maternal behavior in predicting attachment security in low SES samples suggest that there may be other aspects of high-risk environments that influence children's attachment security.

Indication of a direct effects model, in which risks are posited to have a direct effect on children's attachment security, emerges from both De Wolff and van Ijzendoorn's findings and recent theoretical work in attachment. One group of risks with potential significance for children's security can be called "emotional risks." Emotional risks include risk factors that are reflective of the mothers' psychological functioning and the emotional climate of the home, and these risks could have the most profound influence on parent-child relationships (Belsky, 1999). Maternal psychological adjustment, for example, is a critical factor in the determination of secure attachment relationships (Belsky et al., 1995; NICHD, 1997).

Among a sample of low-income mothers, Pianta and Egeland (1990) found that risks that were more reflective of relationship strain between mothers and other family members and romantic partners, such as the presence of domestic violence or a family member with a substance abuse problem, were more predictive of insecure relationships with children than risks related to financial strain. Also, Vondra et al. (1999) found that high-risk mothers' reports of difficulty controlling anger predicted insecure attachment relationships; their anger, however, was not necessarily directed towards their infants, as these mothers displayed *less* anger during mother–child interaction than other mothers. The presence of alcoholism in middle-class homes also seems to pose a threat to children's security (Das Eiden, Peterson Edwards, & Leonard, 2002), as does marital conflict between parents, even when mothers continue to behave sensitively towards their children (Frosch, Mangelsdorf, & McHale, 2000; Owen & Cox, 1997). Children's exposure to domestic violence has also been linked to attachment insecurity (Zeanah, Danis, Hirshberg, Benoit, Miller, & Heller, 1999).

Based on existing evidence, it seems plausible that children's security is influenced by broader emotional experiences within the family system, in addition to the sensitivity of interactions with mothers (Cowan, 1997; Davies & Cummings, 1994; Waters & Cummings, 2000). Primarily relying on marital conflict as the source of negative emotionality in the home, Davies and Cummings' (1994) emotional security hypothesis postulates that children experience security in relation to the emotional valence of the family system, and thus, children's emotional security is not synonymous with nor based entirely upon the quality of interactions between individual parents and children. For example, children's experience of frightening parental behavior, even if that behavior is not directed towards them, may erode the child's sense of emotional security within the home (Thompson, 2000). This hypothesis has been empirically supported by Frosch et al.'s (2000) and Owen and Cox's (1997) results indicating that marital conflict is related to attachment security among infants and toddlers even when mothers are sensitive in interactions with their children.

The potential importance of "emotional risks" in predicting both maternal behavior and attachment security within low-income samples has not yet been adequately explored. Yet emotional risks could be critical: recent work has identified the presence of pervasive negative emotion within the home as a hallmark of families-at-risk and a strong predictor of negative socio-emotional outcomes for children (Repetti, Taylor, & Seeman, 2002), justifying further elaboration of the role of emotional risks in contributing to insecurity in low-income populations. While limited empirical evidence exists regarding the prevalence of emotional risks in low-income families, both domestic violence (Emery & Laumann-Billings, 1998; Tolman & Raphael, 2000) and substance abuse (Kaestner, 1998) show higher prevalence within low-income populations, and may present one mechanism by which rates of child attachment insecurity are higher among low-income families. The prevalence of potentially frightening family situations like excessive anger and aggression, domestic violence and substance abuse could have a profound influence on children's experience of emotional security within the family. Despite their potential importance in influencing security, very few studies on attachment in low SES families have targeted emotional risks as predictors of child security. As a result, little is known about their potential pathways of influence on both maternal sensitivity and child security.

In sum, although maternal behavior and children's security are related within high-risk populations, we do not know if maternal behavior mediates the relation between risk and security, if risk moderates the association between maternal behavior and attachment security, or if higher rates of insecurity in low-income samples are due to processes that operate concurrently with, but independently of, maternal behavior, as proposed by the emotional security hypothesis. Further, it is unclear from present work

whether different types of risk operate on sensitivity and security in distinct ways. The creation and maintenance of security in high-risk populations is undoubtedly complex. As stated by Bronfenbrenner (1979, p. 38), the “principle main effects are likely to be interactions.”

The present study had several sets of goals, designed to test prevailing assumptions about the development of attachment relationships in high-risk settings. First, we were interested in testing a mediational model of risk and security by identifying how risks are related to maternal sensitivity, and whether decreases in maternal sensitivity due to high levels of risk account for relations between risk and child attachment security. Second, we were interested in testing a moderational model, namely that risks that could reduce the power of maternal sensitivity to predict attachment security. Consistent with findings reported by De Wolff and van Ijzendoorn (1997), we hypothesized that high levels of risk would decrease the size of the relation between sensitivity and security. Finally, based on existing evidence regarding the potential importance of emotional risks, we were interested in learning whether the emotional dynamics of the larger family system would *directly* affect children’s attachment security, even after controlling for the influence of maternal behavior.

Broadening our conceptualizations of the antecedents of attachment security may become increasingly important as children gain cognitive competence and are able to create complex representations of both caregivers and family environments (Thompson, 2000). Accordingly, the present study relied on a sample of 2-year-old children. A limitation of our present understanding of security within high-risk contexts is that most observational measures of security have been conducted with samples of infants. Because children make substantial gains in cognitive representational abilities during the second and third years, it is important to identify contextual determinants of security *after* infancy due to children’s increased capacities for symbolic thought and reasoning, which facilitate the incorporation of environmental influences into internal working models.

In addition, during this stage, some types of risks may have more profound influences on children’s sense of security than other risks. Despite the predictive power of cumulative risk models, a limitation to this approach is that risks may operate on security through different pathways, and grouping risks together obscures the unique influence of individual risk factors on attachment security (Thompson & Raikes, 2003).

Accumulation of some kinds of risks may create a situation in which the role of maternal sensitivity on attachment security is moderated, while other types of risk could operate on attachment security either directly or by decreasing sensitivity. Because risks may influence security and sensitivity differently, grouping risks together based on proposed mechanisms of influence also offers a more concrete manner of replicating results across studies. To address this concern, the present study utilizes models that are based on grouping risks according to mechanisms of influence, especially differentiating economic from emotional risks within the family.

## 2. Method

### 2.1. Participants

A sample of 63 high-risk, low-income mothers and children aged 24 to 36 months (mean = 29.2 months) was recruited from an early intervention program for families in poverty in a Midwestern city.

The majority of the mothers who were contacted agreed to participate; eight mothers refused participation. Children who were in foster care or who were being cared for by mothers after having been in foster care were not included in the sample. Two participants were biological grandmothers who had been the primary caretaker for the child since infancy. Mothers' ages ranged from 19 to 54 years (mean = 29 years; the mean age excluding grandmothers was 28 years). Twenty percent of the mothers had less than a high school diploma, and 25% had completed some college or had a college degree. Eighty-five percent had income under US\$1500 per month. Fifty-four percent reported being employed at the time of the observation, and 46% were unemployed. Forty-one percent of the children were White, 25% were African-American, 8% were Hispanic, and 25% were recent immigrants of Russian, Saudi, Iraqi or African descent. For families who spoke English as a second language (two Hispanic families and all of the recent immigrant families), materials were translated and back-translated by pairs of native speakers. Native speakers also accompanied observers on home visits and provided translation services for the observers. Thirty-five of the children were female. Seventy percent of the children had at least one sibling.

The families participated in an intervention based on general family support that had no specific goals for enhancing maternal behavior or child security, and the number of home visits received and the average level of engagement in the program varied by family. We did not expect to find any effects of program participation on maternal behavior or child security, but analyses were conducted to identify any program effects that could have altered relations between maternal behavior and child security. There were no significant relations between program involvement (including level of engagement in the program and the intensity of services received through the program), and maternal behavior or child attachment security for the families for whom data were available. Using a partial correlation, we then examined the relation between maternal behavior and child attachment security controlling for program involvement, and found the relation was not affected by program involvement. All subsequent analyses were thus conducted without controlling for program involvement.

## 2.2. Measures

### 2.2.1. Attachment security

To assess attachment security, children were observed in their homes for 90–120 min by trained observers who then completed the Attachment Q-Sort (Waters & Deane, 1985). Observer sorts of the Attachment Q-Sort have been shown to provide a valid indication of children's security (van Ijzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). Observers sorted 90 cards into nine groups based on how accurately the cards described the child's behavior. Each item on the Q-Sort has been assigned a value indicating the score a prototypically "secure" child would receive on that item; security scores were calculated by correlating the observed child's scores on Q-Sort items with a security criterion sort containing values for the prototypically secure child.

Two research assistants with substantial background in attachment theory were trained to conduct Q-Sort observations using guidelines provided by Everett Waters, and by conducting practice observations in pairs. Reliability for the two observers who conducted the observations was calculated by correlating their scores on sorts of 10 different children's behavior, and averaged 0.71; correlations between the scores for the visits ranged from 0.65 to 0.80. The remaining 53 visits were conducted by one observer.

Visits were scheduled at a time convenient for the mothers, and mothers were told that they should behave as they normally behave while at home with the child. Information about the mothers' economic

and risk status was collected at the end of the observation, and observers were blind to economic and risk status before completing the sorts. Although it is feasible that some risks were visible to observers and therefore may have influenced their sorts, in no instance did observers witness any of the emotional risk factors (described below), such as family violence, drug or alcohol abuse, or excessive anger on the part of the parent. In addition, due to the availability of subsidized housing for low-income families in the community where the study was conducted, the quality of the family's housing was not necessarily an indicator of the overall risk level of the family. Children's scores on the Attachment Q-Sort ranged from  $-0.21$  to  $0.75$  ( $M = 0.22$ ,  $S.D. = 0.24$ ). The mean for this sample is consistent with security score means for other high-risk samples; across multiple studies using the Attachment Q-Sort, [van Ijzendoorn et al. \(2004\)](#) reported a mean of  $0.32$  for normal samples and a mean of  $0.21$  for clinical samples.

### 2.2.2. Maternal behavior

Data on maternal behavior were collected during a separate visit by a second trained observer using the Infant/Toddler HOME Scale ([Caldwell & Bradley, 1984](#)), a scale previously shown to provide a valid indication of maternal sensitivity towards the child in a naturalistic setting and to be a reliable predictor of attachment security (i.e., [Diener et al., 2003](#)). Maternal behavior captured by the HOME Scale has shown stronger relations with children's security than laboratory-based measures of maternal sensitivity ([NICHD, 1997](#)). The HOME Scale contains 45 items describing the home environment, and observers rate each item as being present or absent. Visits lasted on average 1 h. Observers were trained using the manual for the HOME Scale and obtained reliability with each other by attending visits in pairs; when scores were within one point on five separate observations (44 out of 45 items scored identically), observers were considered reliable and they collected data independently. A score for maternal behavior was calculated using the following items from the HOME Scale: parent spontaneously vocalizes to child at least twice during visit; parent responds verbally to child's vocalizations; parent tells child name of object or person during visit; parent spontaneously praises child twice; parents' voice conveys positive feelings towards child; parent caresses or kisses child at least once; parent responds positively to praise of child offered by visitor. Scores on maternal behavior ranged from 1 to 7 ( $M = 5.54$ ,  $S.D. = 1.49$ ). The coefficient alpha for this scale was  $0.63$ . Data were missing for one family.

### 2.2.3. Emotional and economic risk information

Mothers were given a checklist of 22 emotional and economic risks and were asked to indicate which risks applied to them. The intervention program the mothers were enrolled in also used the checklist of risks to determine program eligibility. Mothers were told that the list helped the program and the researchers understand the types of issues that affected the family. Mothers were familiar with the items on the checklist and had been asked about them before the time of the observation, which increased their familiarity and comfort in answering the questions. None of the mothers refused to respond to questions regarding family risk. Mothers were also asked to report their ages, family income levels, education levels, employment status, the child's age, and what adults and children presently lived in the home with the mother and the child.

Given the likelihood that children are more adversely affected by totality of risk than by the presence of unique risks (e.g., [Sameroff & Fiese, 2000](#)), one way to create an accurate representation of the diversity of stresses experienced by low-income people is to sum risks but to do so according to the proposed mechanisms of influence on security. In keeping with this framework, in the present study, we attempted to classify risks into two groups, based on whether (a) they indicate negative emotionality,

emotional instability, or would have a strong impact on the emotional climate of the home, or (b) whether they are risks reflecting poverty and the economic stability of the family. As described above, we presented mothers with a broad list of risks, 22 in total, that indexed problems faced by families in poverty. The risks included on the checklist were divided into two groups: 1) emotional risks, or those hypothesized to affect the emotional climate of the home; and 2) economic risks reflecting poverty. From the original list of 22 risks, six emotional risks and six economic risks were selected for summation into an index because of their high prevalence among families in poverty and their conceptual importance for the questions addressed in the present study. Emotional risks included the presence of alcohol or drug abuse in the family, a family member with problems controlling anger, the presence of domestic violence in the home, parental incarceration or criminal activity, mothers' separation from a partner during the past year, and the presence of an emotional disability. The most common emotional risks were domestic violence (39.7% of the sample reporting this risk), excessive anger (34.9%), and parental incarceration or criminal activity (33.9%). Emotional risks ranged from zero to six (with a score of six indicating that the mother reported experiencing all six risks), with 28.6% of the sample reporting no emotional risks, and 19.1% reporting four or more ( $M = 1.86$ ;  $S.D. = 1.63$ ).

Economic risks included being a teen at the time of the child's birth, receipt of Temporary Assistance to Needy Families (a marker of extreme poverty), being a single parent, having two or more children under the age of six in the home, being unemployed, and being without a high school diploma. The most common economic risks were having two or more children under the age of six in the home (70% of the sample reporting this risk), being unemployed (47%), and being a single parent (37%). Economic risks ranged from zero to six (with a score of six indicating that the mother reported experiencing all six risks), with 25.3% reporting no or one economic risk and 20.6% reporting four or more ( $M = 2.27$ ;  $S.D. = 1.25$ ).

### 3. Results

#### 3.1. Analytic strategy

Bivariate relations between the hypothesized predictors of attachment security appear in Table 1. Child gender and economic risk were significantly correlated (see Table 1) and bivariate analyses also revealed substantial relations between child gender and attachment security ( $r = -.50, p < .001; N = 63$ ; girls were coded as 0 and boys as 1). Thus gender was included in all subsequent multivariate analyses. Because gender was strongly related to attachment security, and because families with boys had higher levels of economic risk than families with girls, further tests were conducted to determine whether the bivariate associations between predictor and criterion variables differed according to gender. Results

Table 1  
Bivariate relations between predictors of attachment security

	Gender (Boys = 1)	Economic risk	Emotional risk
Economic risk	0.38*		
Emotional risk	-0.02	0.19	
Maternal behavior	-0.17	-0.31*	-0.10

$N = 63$ . For maternal behavior,  $n = 62$ .

\*  $p < .01$ .



indicated a significant interaction between gender and maternal behavior, such that maternal behavior was more strongly related to attachment security for girls than for boys. Accordingly, the interaction between gender and maternal behavior was included in all regression models.

To determine the strength of the relation between maternal behavior and attachment security for boys and girls, we conducted post-hoc analyses following the guidelines of Holmbeck (2002). Holmbeck recommends examining conditional effects by designating a zero point for the moderator, which allows the conditional effects of the predictor on the outcome to be analyzed. The first step of this procedure was to create two new variables for the moderator (gender) that coded each group as 0 once but always coded males higher than females. These new variables were then multiplied by maternal behavior to compute two new interaction terms that were specific to gender. Next, the newly created gender variable, and its interaction term, was entered into a regression model along with maternal behavior. In effect, one model allowed us to analyze the association between maternal behavior and attachment security for boys, and the other for girls. We found that maternal behavior was significantly and positively associated with security for girls; the slope of the line for the relation between maternal behavior and security was not significantly different than zero for boys. This effect was consistent across all regression models reported. The interaction between gender and maternal behavior appears in Fig. 1.

### 3.2. Economic risks: Mediating, moderating, and direct effects models

#### 3.2.1. Mediating model

These analyses examined whether the association between economic risks and attachment security was mediated by maternal behavior. Holmbeck (1997) states that the following four conditions must be met in order to claim a mediated effect: 1) the predictor (economic risks) must be associated with the mediator (maternal behavior) see Tables 1 and 2); 2) the predictor must be associated with the dependent variable (attachment security),  $r = -.28$ ,  $p < .05$ ;  $N = 63$ ; 3) the mediator must be significantly associated with the dependent variable, and 4) the impact of the predictor is reduced after controlling for the mediator. Conditions 3 and 4 should be evaluated using a multiple regression model containing both the predictor and the mediator. Therefore, because the first two conditions were met in bivariate associations, models were created to evaluate whether conditions 3 and 4 were met in multivariate regression analyses. Holmbeck also recommends entering all of the variables into one step of the model,

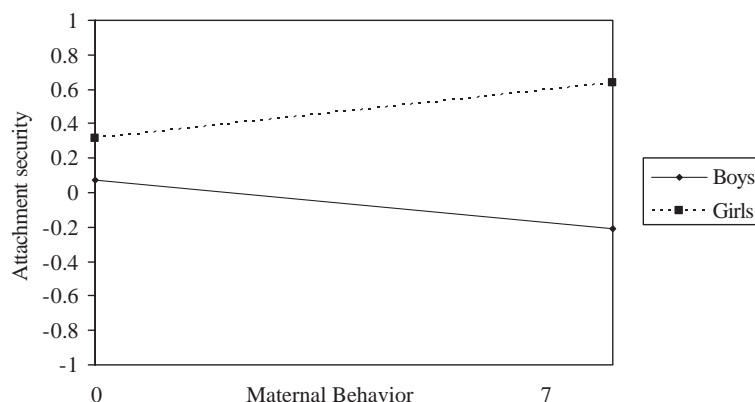


Fig. 1. Interaction between maternal behavior and gender, as related to children's attachment security.

Table 2  
Summary of multiple regression analysis of economic risks as predictors of attachment security

	B	SEB	$\beta$
Step 1			
Gender	−0.24	0.06	−0.49***
Maternal behavior	0.06	0.02	0.36*
Maternal behavior $\times$ Gender	−0.10	0.04	−0.35*
Step 2			
Gender	−0.23	0.05	−0.47
Maternal behavior	0.05	0.02	0.31*
Maternal behavior $\times$ Gender	−0.09	0.04	−0.35*
Economic risks	−0.01	0.02	−0.06
Step 3			
Gender	−0.22	0.06	−0.46
Maternal behavior	0.05	0.02	0.32*
Maternal behavior $\times$ Gender	−0.09	0.04	−0.33*
Economic risks	−0.01	0.02	−0.07
Economic risks $\times$ Maternal behavior	−0.02	0.02	−0.12

$R^2 = 0.33$  for Step 1;  $\Delta R^2 = 0.00$  (ns) for Step 2 and  $\Delta R^2 = 0.01$  for Step 3 (ns).

\*  $p < .05$ . \*\*\*  $p < .001$ .

so that effects are simultaneously controlled. As noted above, child gender and the interaction between gender and maternal behavior were included in all of the models; these three variables appear in the first step of the model, and results for the mediation test appear in the second step of the model.

Results from the first step of the model (see top section of Table 2) indicated that maternal behavior, child gender, and the interaction between child gender and maternal behavior were all significant predictors of children's attachment security, and accounted for 33% of the variance in attachment security ( $R^2 = 0.33$ ,  $F(3, 61) = 9.64$ ,  $p < .0001$ ), but economic risks, added on the second step, were not a significant predictor, and did not improve the model ( $R^2 = 0.33$ ,  $F(4, 61) = 7.21$ ,  $p < .0001$ ). Boys were less secure than girls, and maternal behavior was positively associated with children's attachment security. After including maternal behavior in the model, therefore, economic risks were no longer related to attachment security, and the beta weight was nearly reduced to zero. Results from this model (see Table 2, Step 2) indicate that maternal behavior mediates the association between economic risk and children's attachment security. Mothers with high levels of economic risk are less responsive towards their children; less responsive parenting, in turn, is related to children's attachment security.

### 3.2.2. Moderating model

We then examined the potential moderating effects of economic risks on the relation between maternal sensitivity and attachment security. The results appear in Table 2, Step 3. To prepare variables for analyses, they were centered and interaction terms were computed by multiplying centered terms by one another. Using hierarchical multiple regression, child gender, maternal behavior, and the interaction between maternal behavior and gender were entered on the first step, and economic risks were entered on the second step. As noted in the presentation of the mediational model, the first step of the model accounted for 33% of the variance in attachment security, and the addition of economic risks did not significantly improve the model. The interaction between maternal behavior and economic risks was entered on the third step; the addition of the interaction between maternal

behavior and economic risk did not account for significantly more variance in attachment security. Economic risk did not moderate the association between maternal behavior and child security. In other words, the size of the relation between maternal behavior and security was consistent across levels of economic risk.

### 3.2.3. Direct effects model

As noted above, after controlling for maternal behavior, economic risk no longer showed a reliable relation to children's attachment security. Accordingly, there was no evidence for direct effects of economic risk on children's security.

## 3.3. Emotional risks: Mediating, moderating, and direct effects models

### 3.3.1. Mediating model

By Holmbeck's criteria, the first requirement for a mediated model is that the predictor is significantly associated with the mediator. As previously noted, however, there was no bivariate association between emotional risks and maternal behavior (see Table 1). Therefore, the conditions for testing a mediated effect outlined by Holmbeck (1997) were not met.

### 3.3.2. Moderating model

We then proceeded to test a moderating model. Consistent with the formulation cited above for testing a moderating influence of economic risks, we entered child gender, maternal behavior, and the interaction between maternal behavior and gender as predictors of maternal behavior in the first step, and in the second step, emotional risks were entered. As can be seen in the upper portion of Table 3, results from this model indicated that child gender, maternal behavior, and the interaction

Table 3  
Summary of hierarchical regression analysis of emotional risks as predictors of attachment security

	B	SEB	$\beta$
Step 1			
Gender	-0.24	0.06	-0.49***
Maternal behavior	0.06	0.02	0.36*
Maternal behavior $\times$ Gender	-0.10	0.04	-0.35*
Step 2			
Gender	-0.25	0.05	-0.51***
Maternal behavior	0.05	0.02	0.29*
Maternal behavior $\times$ Gender	-0.09	0.04	-0.32*
Emotional risks	-0.03	0.02	-0.22*
Step 3			
Gender	-0.23	0.05	-0.47***
Maternal behavior	0.06	0.02	0.36*
Maternal behavior $\times$ Gender	-0.09	0.04	-0.33*
Emotional risks	-0.03	0.02	-0.18+
Emotional risks $\times$ Maternal behavior	-0.02	0.01	-0.19+

$R^2 = 0.33$  for Step 1;  $\Delta R^2 = 0.05$  ( $p < .05$ ).  $R^2 = 0.38$  for Step 2;  $\Delta R^2 = 0.03$  ( $p < .10$ ).  $R^2 = 0.41$  for Step 3.  
+ $p < .10$ . \*  $p < .01$ . \*\*\*  $p < .001$ .

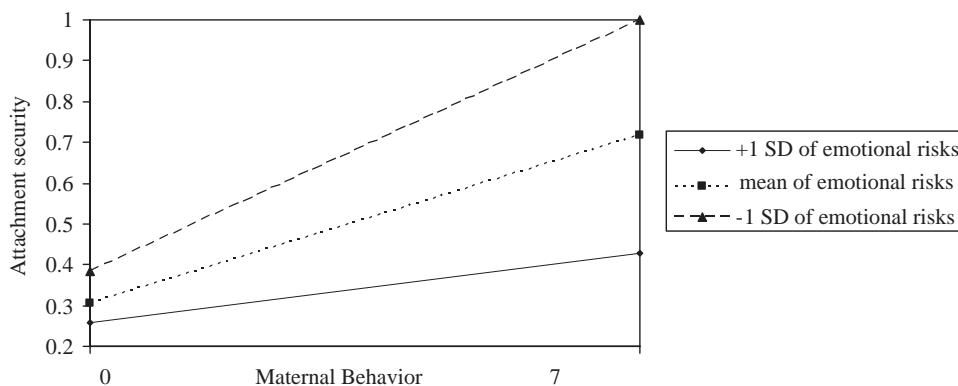


Fig. 2. Interaction between maternal behavior and emotional risks, as related to children's attachment security.

between child gender and maternal behavior accounted for 33% of the variance in attachment security ( $R^2 = 0.33$ ,  $F(3, 61) = 9.64$ ,  $p < .0001$ ), and emotional risks then accounted for significantly more variance in children's attachment security, entered in Step 2 ( $R^2$  change = .05,  $p < .05$ ;  $R^2 = 0.38$ ,  $F(4, 61) = 8.78$ ,  $p < .0001$ ). Emotional risks were negatively associated with children's attachment security. On the third step of the model, the interaction between maternal behavior and emotional risks was entered. The contribution provided by the interaction term to the model approached statistical significance ( $R^2$  change = .03,  $p < .10$ ;  $R^2 = 0.41$ ,  $F(5, 61) = 7.81$ ,  $p < .0001$ ).

The interaction between maternal behavior and emotional risks appears in Fig. 2. Post-hoc testing of the statistical interaction indicated that the slope of the regression line for families high in emotional risks was not significantly different from zero. For families low in emotional risks, the slope of the regression line was statistically significant and positive. In sum, for families high in emotional risks, maternal behavior is not associated with children's attachment security, but for families low in emotional risks, maternal behavior shows a positive relation with children's security.

### 3.3.3. Direct effects

In all of the multivariate models tested, emotional risks exerted a significant negative effect on children's attachment security, providing evidence for a direct effect of emotional risks on children's security.

## 4. Discussion

This study was designed to test paths of influence between risk, maternal behavior and child attachment security. Support was obtained for mediated, moderated and direct effects models, confirming previous predictions that ecological influences affect maternal behavior and child security in complex ways (Belsky, 1999). Specifically, the path of influence varied by the type of risk. Maternal behavior mediated the impact of economic risks on children's attachment security. However, emotional risks showed a direct effect on security and also moderated the influence of maternal behavior on child attachment security. Emotional risks were negatively related to attachment security above and beyond the influence of maternal behavior.

This is one of the first studies to empirically demonstrate that maternal behavior mediates the association between economic risk and attachment security. While past work has assumed a mediational effect, no work to date has specifically tested it. In this sample, mothers with many economic risks behaved less responsively towards their children, which in turn undermined attachment security. As predicted by attachment theory, economic risks alone had no direct impact on attachment security, but their influence was indirectly mediated by maternal behavior. Although this study did not measure the content of maternal representations, other evidence also suggests that economic risks have an indirect effect on children's security, through an associated effect on representations of caregiving (Huth-Bocks, Levendosky, Bogat, & von Eye, 2004). Economic risks could affect mothers' beliefs about their abilities to be good caregivers, thus affecting maternal behavior, or economic risks could affect maternal behavior due to the stress associated with living in poverty (McLoyd, 1998). Huth-Bocks et al. (2004) included no measures of maternal behavior, thus precluding replication of their findings in the present study and preventing evaluation of the impact of economic risks on behaviors and representations, but together with the present study, findings suggest that economic risks may exert an indirect effect on children's security, mediated either through maternal representations, maternal behavior, or perhaps both. What is important is that the pathway from economic risks to child security is mediated by the mother. This pathway stands in contrast to the potentially direct effect of emotional risks on child security.

The direct, negative impact of emotional risks on children's attachment security suggests that the concept of emotional security, as proposed by Davies and Cummings (1994), may be a useful framework for understanding contextual influences on attachment security. While Davies and Cummings discuss emotional security primarily as a mechanism linking marital conflict to adverse child outcomes, the principles behind the theory—namely, that children may experience insecurity as part of a family system that involves frightening parental behavior—are applicable to the development of attachment security in young children, especially in situations where children are overwhelmed with negative affect. In a sense, the difficulties encountered by families struggling with many emotional risks could exceed the benefits of responsive parenting for secure attachment relationships. Other than providing a clear indication that emotional risks affect children's security, the present study does not provide insight into the mechanisms that link emotional risks to children's attachment security, a task which should be undertaken in future empirical and theoretical work.

Despite this limitation, results from this work offer support for conceptualizing risk in terms of the resulting emotional climate created in the home. Likewise, it is important to separate emotional risks, potentially a vivid portrayal of psychological functioning within the family, from economic risks that could accompany poverty without necessarily leading to high degrees of negative emotionality, such as welfare receipt, single parenting and unemployment. Results from this study clearly indicate that different types of risks operate in different ways. Further, it is notable that emotional and economic risks did not show a significant relation with one another (see Table 1) in this sample, underscoring the importance of separating types of risk and tracing pathways to security based on mechanisms of influence. Although all families in this sample had incomes low enough to make them eligible for enrollment in a program designed to counter the effects of poverty on child development, families varied dramatically with regard to risk type and prevalence.

An unexpected finding from this study was that boys were significantly less likely to be securely attached than girls, and moreover, that maternal behavior did not predict security among boys, but showed a strong relation to girls' security. High rates of insecurity among low-income boys have been

reported in other studies (Anan & Barnett, 1999; Barnett et al., 1998). Boys have been found to be more sensitive to high-risk environments across numerous studies (e.g., Duncan, Brooks-Gunn, & Klebanov, 1994; Repetti et al., 2002), and one possibility is that mothers and sons may have particular trouble forming secure attachment relationships in high-risk settings. In addition, consistent with the findings reported in the present study, other studies have found that maternal behavior is less predictive of security for boys than for girls (Fish & Stifter, 1995). Some work has suggested that different aspects of maternal behavior predict security among girls and boys (van Ijzendoorn et al., 2000). Because boys are more likely to show negative outcomes in relation to attachment insecurity (Greenberg, 1999), future work should attempt to identify how mother–son relationships develop among families in poverty, and how the relation between maternal behavior and child security could be moderated by child gender.

There are important implications for practice that emerge from this study. First, different types of risk—economic and emotional—affect attachment security through qualitatively different pathways, and families in poverty show considerable variation in the type and degree of risks they experience. Accordingly, practitioners may find that the most effective interventions are those that support families in dealing with both economic and emotional risks, with unique strategies designed to assist families facing different types of risk. Moreover, early intervention programs designed to promote strong, healthy relationships between mothers and children may need to provide families with intensive support in addressing emotional risks. While addressing issues like substance abuse and domestic violence requires substantial investments on the part of programs, results from this study indicate that such investments may improve the probability of positive outcomes for children. Many intervention programs are designed to improve child outcomes by addressing maternal behavior; although this strategy is clearly valuable, it may not be enough to ensure that children exposed to emotional risks are able to form secure attachment relationships with their mothers.

There are limitations to this study that should be mentioned. First, the actual level of negative emotionality in the home was not observed, and so conclusions regarding emotional risks, resulting negative affect and influences on attachment security are based on hypothesized, but not conclusive, indices of the emotional climate in the home. Second, the sample of families used in this study was very high risk, and the constellation of risks present within this sample may be unique to this sample. However, even in light of these shortcomings, the present findings suggest potentially fruitful new directions for future work describing the development of attachment relationships in low-income populations.

Overall, the present study is a step towards several recently defined goals for attachment theory (e.g., Belsky, 1999; Waters & Cummings, 2000), and joins other studies demonstrating that difficult contextual conditions can moderate the association between maternal behavior and child security (i.e., Avieзера, Sagi-Schwartz, & Koren-Karie, 2003). More broadly, results from this study provide additional insight into the means by which ecological context affects maternal behavior and child security.

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